

Patent Claims:

1. A device for regenerating an electroless metal plating bath, comprising
electrodialysis arrangements (**E1**, **E2**), each having diluate
compartments (**Di1y**, **Di2y**) for holding the metal plating bath,
concentrate compartments (**Ko1y**, **Ko2y**) that are separated from the
diluate compartments (**Di1y**, **Di2y**) through ion exchange membranes
and are intended to hold a concentrate fluid serving to adsorb interfering
substances that are to be removed from the metal plating bath as well as
anodes (**An**) and cathodes (**Ka**),

wherein main cation exchangers (**I_x**) for removing metal ions from the
concentrate fluid are provided, said cation exchangers being coupled to
the concentrate compartments (**Ko1y**, **Ko2y**) in such a manner that the
concentrate fluid is allowed to be conducted through the main cation
exchangers (**I_x**) and to be recirculated back into the concentrate
compartments (**Ko1y**, **Ko2y**).

2. The device according to claim 1, **wherein** said device is comprised of
- a) a first electrodialysis arrangement (**E1**) having alternating
concentrate compartments (**Ko1y**) and diluate compartments (**Di1y**)
as well as cathodes (**Ka**) and anodes (**An**), the diluate compartments
(**Di1y**) being each separated on the cathode side thereof from a
neighbouring concentrate compartment (**Ko1y**) by a monoselective
cation exchange membrane (**KS**) and on the anode side thereof from
a neighbouring concentrate compartment (**Ko1y**) by an anion
exchange membrane (**A**),
- b) a second electrodialysis arrangement (**E2**) having alternating diluate
compartments (**Di2y**) and concentrate compartments (**Ko2y**) as well
as cathodes (**Ka**) and anodes (**An**), the concentrate compartments
(**Ko2y**) being each separated on the cathode side thereof from a

neighbouring diluate compartment (**Di2y**) by an anion exchange membrane (**A**) and on the anode side thereof from a neighbouring diluate compartment (**Di2y**) by a monoselective anion exchange membrane (**AS**),

5 so that the metal plating bath can be conducted simultaneously through all of the diluate compartments (**Di1y, Di2y**) in the two electro dialysis arrangements (**E1, E2**) that are connected in parallel and the concentrate fluid through all of the concentrate compartments (**Ko1y, Ko2y**) in the two electro dialysis arrangements

10 (**E1, E2**) that are connected in parallel, and

c) current supplies for the cathodes (**Ka**) and the anodes (**An**) of the first electro dialysis arrangement (**E1**) and of the second electro dialysis arrangement (**E2**).

15 3. The device according to any one of the preceding claims, **wherein** collecting tanks (**V_K**) are provided, said collecting tanks being coupled to the concentrate compartments (**Ko1y, Ko2y**) and to the main cation exchangers (**I_x**) in such a manner that the concentrate fluid is allowed to circulate in a first circuit between the concentrate compartments (**Ko1y,**

20 **Ko2y**) and the collecting tanks (**V_K**) and in a second circuit between the collecting tanks (**V_K**) and the main cation exchangers (**I_x**).

4. The device according to any one of the preceding claims, **wherein** first regenerant fluid vessels (**V_{RS1}**) for holding regenerant fluid intended for

25 the regeneration of the main cation exchangers (**I_x**) are further provided, said vessels being coupled to the main cation exchangers (**I_x**).

5. The device according to any one of the preceding claims, **wherein** service reservoirs (**V_{ZK}**) for holding concentrate fluid are further provided,

30 said reservoirs being coupled to the collecting tanks (**V_K**) and to the main cation exchangers (**I_x**).

6. The device according to any one of the preceding claims, **wherein** safety cation exchangers (I_s) are further provided, said exchangers being coupled to the main cation exchangers (I_x) for post-treatment of the concentrate fluid treated in the main cation exchangers (I_x).

7. The device according to any one of the preceding claims, **wherein** second regenerant fluid vessels (V_{RS2}) for holding regenerant fluid intended for the regeneration of the safety cation exchangers (I_s) are provided.

8. A method for regenerating an electroless metal plating bath, comprising conducting the metal plating bath through the respective diluate compartments ($Di1y$, $Di2y$) of electrodialysis arrangements ($E1$, $E2$) and conducting a concentrate fluid serving to adsorb interfering substances that are to be removed from the metal plating bath through respective concentrate compartments ($Ko1y$, $Ko2y$) of the electrodialysis arrangements ($E1$, $E2$), said concentrate compartments being separated from the diluate compartments ($Di1y$, $Di2y$) by ion exchange membranes,

wherein the concentrate fluid is moreover passed through main cation exchangers (I_x) and is recirculated back into the concentrate compartments ($Ko1y$, $Ko2y$).

9. The method according to claim 8, **wherein** the metal plating bath

a) is conducted through diluate compartments ($Di1y$) in a first electrodialysis arrangement ($E1$) comprising alternating concentrate compartments ($Ko1y$) and the diluate compartments ($Di1y$) as well as cathodes (Ka) and anodes (An), the diluate compartments ($Di1y$) being each separated on the cathode side thereof from a neighbouring concentrate compartment ($Ko1y$) by a monoselective cation exchange

membrane (**KS**) and on the anode side thereof from a neighbouring concentrate compartment (**Ko1y**) by an anion exchange membrane (**A**), and

b) through diluate compartments (**Di2y**) in a second electrodialysis arrangement (**E2**) comprising alternating the diluate compartments

(**Di2y**) and concentrate compartments (**Ko2y**) as well as cathodes (**Ka**) and anodes (**An**), the concentrate compartments (**Ko2y**) being each separated on the cathode side thereof from a neighbouring diluate

compartment (**Di2y**) by an anion exchange membrane (**A**) and on the

anode side thereof from a neighbouring diluate compartment (**Di2y**) by a monoselective anion exchange membrane (**AS**), and

wherein the metal plating bath is simultaneously conducted through all of the diluate compartments (**Di1y**, **Di2y**) in the two electrodialysis arrangements (**E1**, **E2**) that are connected in parallel and the

concentrate fluid through all of the concentrate compartments (**Ko1y**, **Ko2y**) in the two electrodialysis arrangements (**E1**, **E2**) that are connected in parallel.

10. The method according to any one of claims 8 or 9, wherein the concentrate fluid is conducted through collecting tanks (**V_K**) from where it is passed through the main cation exchangers (**I_X**).
11. The method according to any one of claims 8 - 10, wherein, for regenerating the main cation exchangers (**I_X**), concentrate fluid contained in the main cation exchangers (**I_X**) is displaced by a regenerant fluid and is recirculated back into the collecting tanks (**V_K**), the main cation exchangers (**I_X**) being regenerated in the process.
12. The method according to claim 11, wherein the regenerant fluid is drawn from first regenerant fluid vessels (**V_{RS1}**) and is transferred to the main cation exchangers (**I_X**).

13. The method according to any one of claims 11 or 12, **wherein** the regenerant fluid is displaced by the concentrate fluid after regeneration of the main cation exchangers (I_x) is complete, the regenerant fluid being recirculated back into the first regenerant fluid vessels (V_{RS1}).

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14. The method according to any one of claims 8 - 13, **wherein** concentrate fluid flows through several main cation exchangers (I_x) at different times with the regenerant fluid being circulated through those main cation exchangers (I_x) through which the concentrate fluid is not circulating for regeneration thereof.

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